

52 Miracle Drugs—Or Not?



In the last activity, you saw how important it is to follow directions and complete the full course of antibiotics as prescribed. Are antibiotics truly miracle drugs? Will they cure every infection? What can people do to maintain the effectiveness of antibiotics?



CHALLENGE

What happens when antibiotics are overprescribed or used improperly?

MATERIALS



For each student

Student Sheet 51.1, "Anticipation Guide: Miracle Drugs?" from Activity 51

PROCEDURE

1. Read about the miracle drugs known as antibiotics. As you read, think about what you might do if you were prescribed an antibiotic.
2. Discuss Analysis Question 1 with your group.

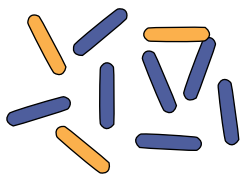
MIRACLE DRUGS—OR NOT?

What if someone told you that the pill you took to get better today might not work for you if you fall sick tomorrow? That's what health experts are saying about the miracle drugs known as antibiotics.

Common Antibiotics		
Antibiotic	Brand name	Used against
Amoxicillin	Amoxil®, Polymox®, Wymox®, Trimox®	bronchitis, ear infections, sinus infections
Ampicillin	Unasyn®	urinary tract infections, meningitis
Cefaclor	Ceclor®	infections of the ear, nose, throat, respiratory tract, and urinary tract; strep throat; pneumonia; tonsillitis
Ceftriaxone	Rocephin®	Lyme disease, gonorrhea
Cephalexin	Keflex®, Keftab®	infections of the skin and urinary tract
Chloramphenicol	Chloromycetin®	typhoid, Rocky Mountain Spotted fever, meningitis
Clotrimazole	Lotrimin®, Mycelex®	yeast infections
Clindamycin	Cleocin®	pneumonia, strep throat, acne
Doxycycline	Atridox®, Doryx®, Doxy®, Periostat®, Vibramycin®	urinary tract infections, chlamydia, trichomonas
Erythromycin	Akne-Mycin®, EryDerm®, Ery-Tab®, Erythrocin®, Ilotycin®, Staticin®	Legionnaire's disease, pneumonia, strep throat, mild skin infections
Isoniazid	Nydrazid®	tuberculosis
Metronidazole	Flagyl®	amoebic dysentery, giardiasis
Monocycline	Minocin®	acne, amoebic dysentery, anthrax, cholera, plague, respiratory infections
Mupirocin	Bactroban®	skin infections, impetigo
Penicillin	various	strep throat, pneumonia, syphilis, dental and heart infections
Tetracycline	Achromycin®	respiratory infections, pink eye, pneumonia, severe acne, typhoid, Rocky Mountain Spotted fever

Activity 52 • Miracle Drugs—Or Not?

THE RISE OF ANTIBIOTIC-RESISTANT BACTERIA



Colony of bacteria.
Some microbes are
antibiotic-resistant
(orange).



Use of antibiotics kills
majority of bacteria,
except those that are
antibiotic-resistant.



Without competition,
antibiotic-resistant
bacteria increase.

Antibiotics have been used to fight diseases for over 50 years. Today, they are losing their effectiveness. This is the result of more antibiotic-resistant bacteria. In the last 10–15 years, antibiotic-resistant bacteria have included strains of *Mycobacterium tuberculosis*, which causes tuberculosis (TB), and *Streptococcus pneumoniae*, the most common cause of human ear and sinus infections.

Some common antibiotics are shown on the previous page. Do you recognize any antibiotics that you have taken?

Reasons for the development of antibiotic-resistant bacteria include over-prescription and incorrect use of antibiotics. “Using antibiotics incorrectly has led to the development of bacteria that can resist them,” says Dr. Richard Dietrich of Kaiser Permanente in Baltimore, Maryland. This means that the drugs people rely on to cure everything from strep throat to bacterial pneumonia may not work when they are taken.




Most antibiotics must be taken over a period of time. When patients feel better, they sometimes stop taking the medication and don’t complete the full course of treatment. In such cases, antibiotic-resistant bacteria may not be killed by the medication. They are more likely to reproduce and grow without competition from other microbes that have been killed by the drug. If the antibiotic-resistant bacteria cause disease, it becomes difficult to treat the patient with antibiotics (see “The Rise of Antibiotic-Resistant Bacteria” in the margin column).

“The bacteria that cause pneumonia and ear and sinus infections commonly live in our throats and noses,” Dr. Dietrich says. “If you take an antibiotic for no good reason, it kills only the germs that are not resistant to the antibiotic. An infection caused by the remaining resistant bacteria can be very hard to treat.” If you take antibiotics when you don’t need them, the drugs may lose their ability to help you get better when you really do need them.

One reason antibiotics are overused is that so many patients ask for them. Dr. Dietrich adds that it’s common for patients to believe that antibiotics will cure whatever illness they have. But antibiotics work against only certain microbes, such as bacteria. They do not work against viruses. Doctors also used to prescribe antibiotics more often, partly as a precaution against disease. Now, this is less common and antibiotics are prescribed only for specific diseases.

Adapted with permission from Kaiser Permanente, 2001

ANALYSIS

1. Complete the “After” column only of Student Sheet 51.1, “Anticipation Guide: Miracle Drugs?”
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 2. Describe what can happen if people take antibiotics when they don’t need them.
3. What is one reason antibiotics are overused?
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 4. You have a sore throat and there are some antibiotics left over from your brother’s strep infection last month. Should you take them for your sore throat? Why or why not?
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 5. Your friend is prescribed an antibiotic on Monday. Suppose she feels better two days later. Should she stop taking the medicine? Explain.
6. **Reflection:** Think about what you have learned in the last few activities. Imagine you don’t feel well and the doctor tells you that you have the flu. The doctor suggests taking an antibiotic. What would you do?

EXTENSION 1

Design a survey to find out what people know about the correct use of antibiotics. Good survey questions should be clear (the person should know exactly what you are asking) and concise (ask for only one piece of information per question). To make it easy to quantitatively analyze the survey data, develop questions that can be answered either yes or no. Examples of good questions include: When you are prescribed an antibiotic, do you always take all of it? Do you always expect a doctor to prescribe an antibiotic when you are sick?



EXTENSION 2

For links to more information on antibiotic resistance, go to the *Issues and Life Science* page of the SEPUP website.